

## ABSTRACT

A multi-core digital signal processor is disclosed having a shared program memory with conditional write protection. In one embodiment, the digital signal processor includes a shared program memory, an emulation logic module, and multiple processor cores each coupled to the shared program memory by corresponding instruction buses. The emulation logic module preferably determines the operating modes of each of the processors, e.g., whether they are operating in a normal mode or an emulation mode. In the emulation mode, the emulation logic can alter the states of various processor hardware and the contents of various registers and memory. The instruction buses each include a read/write signal that, while their corresponding processor cores are in normal mode, is maintained in a read state. On the other hand, when the processor cores are in the emulation mode, the processor cores are allowed to determine the state of the instruction bus read/write signals. Each instruction bus read/write signal is preferably generated by a logic gate that prevents the processor core from affecting the read/write signal value in normal mode, but allows the processor core to determine the read/write signal value in emulation mode. In this manner, the logic gate prevents write operations to the shared program memory when the emulation logic de-asserts a signal indicative of emulation mode, and allows write operations to the shared program memory when the emulation logic asserts the signal indicative of emulation mode. The logic gate is preferably included in a bus interface module in each processor core.